A Guide to the Indian-Cahokia Creek Watershed

MACOUPIN

MADISON

MADISON COUNTY, ILLINOIS







WHAT IS A WATERSHED?

A watershed is an area of land that drains into a common waterbody, such as a creek. Think of it like a bathtub: when a drop of water hits anywhere in the tub, it eventually finds its way to the drain (the lowest point). The rim of the bathtub is like the watershed boundary—any drop falling inside it will eventually reach the main drain, a creek or river.

Healthy watersheds mean that people have clean drinking water, flooding in appropriate locations, thriving wildlife, and recreation opportunities.

THE INDIAN-CAHOKIA CREEK WATERSHED & THE PLAN

Water in the Indian-Cahokia Creek watershed generally flows north to south and east to west. Water flow starts in Macoupin County and moves south and west through Roxana and Hartford to the Mississippi River.

The Madison County Stormwater Management Plan sets county-wide policies to address drainage, and provides recommendations for each watershed in the county based on individual watershed plans. The Indian-Cahokia Creek Watershed Plan was commissioned by Madison County in 2015 to promote a healthy, functioning watershed.

The planning process involved surveys, public meetings, technical analysis, and recommendations formed by a technical advisory committee and a stakeholder committee. The plan is a voluntary document that provides guidance to governments and residents on flood reduction and water quality in the Indian-Cahokia Creek watershed. The document can be found the Madison County Planning and Development webpage.

Goals of the plan are:

- Reduce flooding and mitigate flood damage
- Improve surface water quality
- Promote environmentally sensitive development
- Support healthy wildlife habitat
- Develop organizational frameworks
- Conduct education and outreach

See page 30 of the watershed plan.



the watershed.

WATERSHED PLANNING PROCESS

Early on and throughout the planning process, Madison County and the planning team sought guidance from more than 600 people and more than 90 entities. Interviews were conducted with townships, municipalities, the Madison County Farm Bureau, and County Board members. Small group meetings allowed attendees to provide locations of floods and other issues on large paper maps, and give detailed input on stormwater issues in the watershed. Five Open House events were held to gather input and get feedback from the general public. Madison County and HeartLands also gave presentations at regularly scheduled meetings of organizations such as the Edwardsville Rotary and the East-West Gateway Council of Government's Water Resources Committee, so as to inform larger groups efficiently.

Stakeholder input was of crucial importance in the planning process. Feedback from key stakeholders and the public was used in identifying issues, selecting Critical Area locations and specific project locations, and exploring opportunities for further outreach and education.

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HISTORICAL INDIAN-CAHOKIA CREEK WATERSHED ECOSYSTEM

THE INDIAN-CAHOKIA CREEK WATERSHED is located 18 miles northeast of St. Louis, Missouri predominantly in Madison County, Illinois. Four-hundred ninety-two miles of streams drain 126,000 acres of land.

Once a vast prairie dotted with oak-hickory groves, early settlers of the watershed valued its fertile soils. Historically the prairies were covered with colorful wildflowers and deep-rooted grasses. Bison, woodcocks, swans, elk, and bears were prevalent wildlife in the watershed before settlement.

Much of the forest land was timbered and 99.9% of prairie was converted to agriculture and pasture land. Settlers grew wheat, corn, apples, and peaches. The land was also valued for its extensive coal deposits and many areas were mined.

Historically, Indian Creek meandered along the base of the bluff south into St. Clair County. The stream was altered in 1911 to travel west to drain directly into the Mississippi River at the Lewis and Clark Historic Site.

Today, more than 31,500 residents live in the Indian-Cahokia Creek watershed. Most of the land is still used for farming. There are 12 municipalities, 13 townships, and two counties located within the watershed.

RECREATION

The Indian-Cahokia Creek watershed is a popular location for cycling, including the Madison County Transit (MCT) Watershed Trail, MCT Quercus Grove Trail, MCT Goshen Trail, and MCT Confluence Trail. People can access the Mississippi River at the Lewis and Clark State Historic Site in Hartford.

The Watershed Nature Center, owned by the City of Edwardsville, is a popular recreation and education area. Holiday Shores and Dunlap Lake are popular recreational lakes in the watershed that allow boating. Public access to streams for fishing and paddling is very limited in the watershed.

ADDITIONAL FEATURES OF THE WATERSHED INCLUDE:

- One-quarter of the watershed is deciduous forest.
- A total of 17% of the land in the watershed is in a designated floodplain.
- Route 66 is an iconic highway that stretches through the center of the watershed.



GALLON

IUGS OF MILK



CONDITIONS

While the Indian-Cahokia Creek watershed is considered a somewhat healthy watershed, many issues exist that harm the future vitality of its ecosystem, water quality, and quality of life.

FLOODING AND STREAMFLOW

Rain makes stormwater, which flows into streams and sometimes causes flooding. Floods can be both positive and negative events.

General flooding in floodplains can help recharge groundwater aquifers (which supply drinking water), disperse seeds, activate vegetation, and clear debris from the creeks.

A flash flood is a rapid rise of water along a stream or low-lying area, usually occurring with heavy rainfall over a short period of time. Flash flooding is the most dangerous type of flooding. There is often little or no warning time and high potential to cause damage. Flash floods can occur any time, but are most likely to occur in May in this watershed.

In 2015, Madison County conducted a flood survey. Respondents in the watershed reported 69 floods per year outside the federally designated floodplains.

Besides "flash" rainfall events, stormwater infrastructure (pipes) in the watershed is often too small for the size of the watershed storms. Maintenance has not kept up with needs.

Increasing the amount of areas with impervious cover (i.e., concrete or asphalt) in the watershed also causes an increase in water flowing to streams and increases the risk of flash flooding.

From 1941 to 2016, the average annual volume of water (velocity) passing through Indian Creek has increased 10 cubic feet per second (cfs). The infographic to the left demonstrates the exponential streamflow increases.



- To visualize a 10 cfs increase in Indian Creek streamflow, imagine 75 one-gallon milk jugs of water pouring through a creek in one second. The graphic to the left demonstrates one second, 30 seconds, and one minute totalling 4,500 gallon milk jugs of *additional* water.
- In 10 minutes, that amount flowing through the creek would equal 45,000 gallons (milk jugs) of water on top of regular stream flows- that is 10x the graphic to the left.
- In one hour, that amount would equal 270,000 gallons at a weight of 2,249,100 lbs.
- In a 24 hour period, that amount would equal 6,480,000 gallons.

WATER QUALITY

Streams naturally move sediment and other particles downstream. As these materials are swept away, others come in from upstream, bringing nutrients, organic matter, and more sediment to the streams and Mississippi River.

The clarity of water—whether it looks clear, "milky," or green—can indicate the conditions of the water. Water that is murky can mean that fish and aquatic life cannot survive—and it looks gross. Volunteers have observed milky and green water in Indian Creek about one third of the time at one location.

Clean drinking water is the primary concern with water quality. Humans and animals need clean water to survive. In the watershed, many people and communities use well water for their water supply. Contamination of these water sources is a life-safety issue and can be very expensive to fix.

Water quality is further discussed on page 42 of the watershed plan.



WHAT ARE SOME OF THE CAUSES OF WATER POLLUTION IN THE INDIAN-CAHOKIA CREEK WATERSHED?

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- 54% of soil erosion and its associated sediment comes from cropland
- 55% of streams had moderate to severe erosion
- Poorly maintained septic tanks on private property
- Combined sewers, which carry both stormwater and sewage
- Water seeping into and out of cracked and ageing sewer pipes
- Improper livestock waste
 management
- Littering and dumping
- Industrial and oil leaks

Information in the watershed plan in Appendix A pages 120-129.



COSTS OF FLOODING AND WATER POLLUTION



Flooding and water pollution can have significant impacts on the watershed's residents. It is estimated that flooding cost residents \$12.8 million over a 10-year time span.

Flooding has also caused stress, loss of property access, lost business income, crop damage, and replacement costs of buildings and structures.

Water pollution in streams, rivers, and ponds can pose health risks, such as skin rashes, pinkeye, respiratory infections, and hepatitis. Pollution can make fish unsafe to eat and rivers unpassable for barges and shipping.

More information in the watershed plan, Appendix B, pages 25-26.

Frequency of Survey Responents' Flooding over 10 years.



Costs Associated with Respondents' Flooding over the last 10 years.



RIPARIAN CONDITION

Just as water is essential for aquatic wildlife, many plants grow only in areas with more water, such as wetlands and riparian areas (the land area on either side of a stream). Although riparian vegetation is only a small percentage of land cover in the watershed, it provides important benefits such as slowing flooding, filtering pollutants, reducing erosion along stream banks, providing habitat for wildlife, and offering recreation and scenic beauty. Riparian areas are critical habitat for many bird, mammal, amphibian, reptile, and fish species.

Today, 21% of the watershed's riparian areas are in poor condition. Invasive species such as bush honeysuckle have degraded riparian areas. In other cases, riparian areas have been cleared to create more cropland.

Riparian condition is discussed on page 47 of the watershed plan.



WILDLIFE

Wildlife can be a good indicator of stream health because they reflect the conditions of multiple factors in the environment.

Historically, the watershed was home to many species that are now threatened or endangered:

- Ebonyshell Mollusk (Illinois Species of Special Concern)
- Illinois Chorus Frog (State threatened)
- Mississippi Kite (State threatened)
- Ornate Box Turtle (State threatened)
- Royal Catchfly (State endangered)
- Eastern Prairie Fringed Orchid (Federally threatened)
- Indiana Bat (Federally endangered)
- Leafy Prairie Clover (Federally endangered)
- Least Tern (Federally endangered)
- Northern Long-eared Bat (Federally threatened)
- Pallid Sturgeon (Federally endangered)
- Spectaclecase Mussel (Federally endangered)

Invasive species, such as bush honeysuckle and winter creeper, are threats to natural areas and riparian areas because they crowd out native plants and trees that protect streambanks from erosion.

See page 47 of the watershed plan for more information about wildlife habitat issues and invasive species.

PROPOSED PROJECTS WITHIN THE WATERSHED



PROJECT IDENTIFICATION

Nine specific project locations were identified in the watershed. These projects address life safety issues and multiple goals of the plan by implementing a variety of Best Management Practices. Madison County can use this short list to help communities and landowners in the watershed address needs identified in the stakeholder engagement process.

SPECIFIC PROJECT LOCATIONS

For each project location, the problem/issue is explored, along with a description of the problem. Then, potential solutions that might be used to address the issue(s) are discussed.

Specific project locations are only the sites of *potential* projects. Projects suggested are voluntary, not mandatory, and each one warrants further outreach and assessment. Individual landowners with a stake in the projects may not have been consulted. The sites identified are for outreach purposes only and serve as a place to begin plan implementation.

The following specific project locations are listed and numbered from north to south (not in order of priority).

[1] Worden Flooding

Livingston

- [2] Holiday Lake Flooding
- [3] Sewer Discharge into Ditches by Route 140 in Bethalto
- [4] Runoff from St. Louis Regional Airport (Bethalto)
- [5] Meadowbrook Flooding
- [6] Flooding On Route 140 at Indian Creek (Bethalto)
- [7] Flooding at Route 143, Route 159, & Old Alton Edwardsville Rd.
- [8] Flooding at The Watershed Nature Center
- [9] Dunlap Lake Siltation, Flooding, and Water Quality

LIST OF SPECIFIC PROJECT LOCATIONS

1

2







Worden Flooding

Description of Problem: Heavy rain leads to ponding on several streets and in backyards on the north side of the Village of Worden (causing no property damage). Flooding occurs on Possum Hill Road one to two times per year. Recently, flooding has been worse than it was historically. Backyards have been flooded for almost the entire spring. A project underneath Lincoln Street to improve drainage has helped remove water from ditches between rain events.

Possible Solution: Improve stormwater infrastructure such as larger culverts, detention/retention ponds, and green infrastructure to increase water absorbtion.

Holiday Lake Flooding

Description of Problem: Holiday Lake is a 430-acre lake in northern Madison County in the center of Holiday Shores. The lake is managed by an active Home Owners Association (HOA) and offers fishing, swimming, and boating. The lake has a dam and emergency spillway but does not have a control structure to release water quickly and lower lake levels ahead of predicted storms. The lake silts in at a rapid pace, as documented by the HOA.

Possible Solution: Upgrade dam and spillway system with a control structure to allow faster drawdown of lake levels. Change HOA rules to allow drawdown when heavy storms are expected. Decrease the inflow of sediment to the lake using sediment basins in the surrounding area, and restore streambanks, stream channel, and the riparian area on tributaries. These measures will dramatically decrease flood risk to Holiday Shores residents.

3

Sewer Discharge into Ditches by Route 140 in Bethalto

Description of Problem: Untreated sewer discharges have entered ditches along Route 140 in the Village of Bethalto during and following heavy storms. The sewage lift station flooded in July 2016 and water overtopped Route 140, causing raw sewage to enter the ditch and the roadway. The intersection was shut down and the village had to fill out illegal discharge paperwork with IEPA.

Possible Solution: Elevate the sewage lift station and repair sanitary sewer infrastructure.

4 Runoff from St. Louis Regional Airport (Bethalto)

Description of Problem: St. Louis Regional Airport drains towards the Village of Bethalto. Runoff from the airport has contributed to significant flooding in surrounding neighborhoods. The Village of Bethalto has identified the Kutter-Aljets subdivision as the greatest flooding problem, with structure flooding, road flooding, and loss of access to homes.

The village is currently moving forward with drainage improvements with 20 feet of land ceded from Rose Lawn Memory Gardens and 20 feet ceded from the Kutter-Aljets subdivision, yielding three lots to be used for detention.

Possible Solution: The airport and the village collaborate on regional detention/retention solutions that meet their needs. This could include dry detention or underground detention (e.g., cisterns).

5 Meadowbrook Flooding

Description of Problem: Meadowbrook is an unincorporated community east of Bethalto. Flooding was reported at two locations in yards and streets. The Meadowbrook Sewer District has had issues with sewer overflow. Stakeholders identified flooding locations along Roosevelt Road, and between Fairway Drive and Truman Street.

Possible Solution: Maintain, repair, and upgrade sewer infrastructure and stormwater infrastructure.

6 Flooding on Route 140 at Indian Creek

Description of Problem: Route 140 is a busy road connecting northern Madison County from west to east, connecting communities including Alton, Bethalto, Meadowbrook, Hamel, and Alhambra. Flooding occurs on Route 140 about once a year at Indian Creek. A wide swath of land surrounding the creek upstream and downstream of the road is in the 100-year floodplain. As of 2018, the state of Illinois has plans to fix the road at this location and presumably make improvements to drainage so that the road no longer floods.

Possible Solution: Raise the bridge or enlarge the culvert at Route 140.

7 Flooding at Route 143, Route 159, and Old Alton Edwardsville Road

Description of Problem: Flooding at and around Burroughs Branch bridge at 143 and Old Alton Edwardsville Road, and on Route 159 at Cahokia Creek affecting Drda Lane, is a recurring problem. The county, FEMA, IDNR, and others are also aware of a dumping issue in the floodway.

Possible Solution: Work to cease dumping activities in the floodplain. Improve riparian area around Burroughs Branch with vegetation and off-stream detention to decrease pressure in Cahokia Creek. Stabilize Cahokia Creek's banks and channel and add off-stream detention.

LIST OF SPECIFIC PROJECT LOCATIONS



Flooding at the Watershed Nature Center

Description of Problem: The Watershed Nature Center, located in northwest Edwardsville near downtown, has flooded several times. In 2014, the flooding was especially severe, rising to at least two feet above the floor of the building and causing significant damage. The habitat in and around the lakes was also damaged, and invasive Asian carp species were able to enter the lakes. The center is also monitoring beaver activity, as beaver lodges have interfered with drainage. IDNR has identified state-threatened aquatic species at the site and center staff are monitoring and encouraging visitors to monitor other animals and birds.

Possible Solution: Elevate the buildings at the center to prevent future property damage. In winter, the center should keep water levels low so that ice does not damage structures and to allow for more rainwater. Upstream, add detention basins to decrease the volume of high storm flows. One possible location for detention is on a tributary east of the center adjacent to Madison County Transit-owned property.





Dunlap Lake Siltation and Water Quality

Description of Problem: Dunlap Lake is a 138-acre private lake surrounded by a homes on the east side of Edwardsville. The lake is managed by an active Property Owners Association (POA). The lake was created in 1939 by damming Mooney Creek. People use the lake for swimming and boating, and the lake is stocked every year for fishing. The two major issues at Dunlap Lake are that it is filling up with silt (i.e., reducing storage capacity and increasing flood risk), and that it has water quality problems, such as algae blooms and high fecal coliform levels.

Severe erosion exists south of the lake, which contributes large amounts of sediment to the lake. Besides sediment, other water quality concerns are the nutrients (e.g., phosphorus, nitrogen) that cause algae blooms—including at least one instance of a harmful algal bloom in the lake. Also, human and animal waste has led to high fecal coliform measurements and trash have degraded water quality.

The Dunlap Lake POA is concerned about the safety of the earthen dam, noting that the amount and velocity at which water enters the lake has increased. Riprap has been added to the dam to support it. There is an emergency plan for if the dam is ever breached.

Possible Solution: Increase detention upstream, reduce streambank erosion upstream, reduce chemical fertilizer use upstream, and dredge the lake

HOW TO GET INVOLVED

If you would like to help promote healthy water quality and reduce flooding in the watershed, there are several ways to get involved.

If you are a **landowner, farmer, or land manager**, you can make planting decisions that improve soil health and water quality. The Madison County Soil and Water Conservation District (SWCD) can provide assistance on topics including fertilizers, tillage, seed mixes, cover crops, crop rotation, woodland improvement, erosion control, and more. Find out more by contacting madisoncoswcd@gmail.com or calling 618-656-7300 ext. 3.

If you are a **homeowner**, you can contact HeartLands Conservancy about the Conservation@Home program, which offers guidance in designing your yard for wildlife and stormwater management. Find out more at https://www.heartlandsconservancy.org/conservationhome.php.

If you **live next to a creek, pond, or lake**, you can protect the trees that grow on its banks - and plant more! This will prevent soil erosion and make pleasant, shady habitat for aquatic creatures. Find out more at https://greatriversgreenway.org/design-guidelines/environmental/streambank-planting/.

If you are interested in **learning more about stream health**, you can join Illinois RiverWatch to volunteer to assess stream health using citizen science. This program, locally based out of the National Great Rivers Research and Education Center in East Alton, trains people to measure flow and collect aquatic insects in their neighborhood streams, and then interpret the results to find out how healthy the stream is. Find out more at http://www.ngrrec. org/Riverwatch/.

The cumulative actions of individuals and communities across the watershed can make a big difference in the health of people, wildlife, and the environment.











BEST MANAGEMENT PRACTICES

PREVENTIVE & POLICY-BASED ACTIONS: COMMUNITIES, COUNTIES, TOWNSHIPS, UNITS OF GOVERNMENT



There are many ways for the community and residents to improve water quality and reduce flood impacts in the Indian-Cahokia Creek Watershed.

This list is a sample of possible actions and not a comprehensive list.

For more detailed information and resources, see the Indian-Cahokia Creek Watershed Plan, pages 53-67.

PROTECTION, RESTORATION, AND MANAGEMENT OF NATURAL AREAS

Conserving, restoring, and managing open spaces, particularly natural areas, is a particularly useful way to reduce negative impacts to water quality and flooding. Communities and counties can protect steep slopes, wetlands, and riparian areas through their comprehensive plans, ordinances, and subdivision regulations. In addition, natural areas often provide excellent public recreation areas for hiking, walking, wildlife observation, biking, and paddling.

STORMWATER

Stormwater infrastructure does not typically have a dedicated source of funding like sewer or water infrastructure. Possible solutions for financing stormwater infrastructure (including green infrastructure) and management include a stormwater utility, property or sales taxes, special assessment districts, municipal bonds and state grants, and low interest loans through the state revolving fund.

Likewise, storm drains require regular maintenance and cleaning to prevent clogging and backflow.

NATURAL RESOURCE CONSERVATION POLICIES, SUCH AS RIPARIAN AREA (STREAMSIDE) VEGETATION POLICIES

A riparian buffer is an undisturbed, naturally vegetated stip of land adjacent to a body of water (typically a stream). Among their many benefits, riparian buffers improve water quality, reduce erosion, store floodwater, and provide habitat for wildlife. A riparian buffer ordinance protects a riparian area from clearcutting, new development, and other disturbances and promotes planting new native plants and trees.

HeartLands Conservancy has developed a model riparian buffer ordinance that communities can adopt. Email info@heartlandsconservancy.org for information.



ON-THE-GROUND ACTIONS FOR RESIDENTS, HOMEOWNERS, FARMERS, & LANDOWNERS

Further resources can be found in the Indian-Cahokia Creek Watershed Plan and on Madison **County and HeartLands** Conservancy's websites.

BEST

PRACTICES

NUTRIENT **MANAGEMENT PLANS**

Farmers use Nutrient Management Plans to address manure disposal and manage fertilizer. The goal is to supply plants with the ideal amount of nutrients, minimize runoff, and improve soil condition.

A cover crop is a plant that is used primarily to slow erosion, improve soil health, smother weeds, control pests and diseases, increase biodiversity, and add other benefits on a farm or large garden. In many research studies, corn yields were between three and 10 % higher after cover crops planted.

COVER CROPS

CONSERVATION TILLAGE

Conservation tillage is a soil management technique that leaves at least 30% of the soil surface covered by residue after planting. This planting method increases water infiltration thanks to a more stable soil structure.

GRASSED WATERWAYS

Grassed waterways are broad, shallow, shaped channels designed to carry rainwater across farmland without causing soil erosion. The grass cover and root system in the waterway slows the water flow and protects the channel from eroding.











ACTIONS FOR COMMUNITIES, SUBDIVISIONS, & BUSINESSES

BIOSWALES & VEGETATIVE SWALES

A bioswale is essentially a ditch or shallow depression designed to remove sediment and pollution from rainwater runoff. The gently sloping trough is filled with native vegetation, providing a path for water to run through slowly rather than rushing into the storm sewer or stream.

The plants and soil in the bioswale slow and clean the water before it enters the stream or ground.

DETENTION BASINS

A detention basin is an excavated area installed near streams to protect neighborhoods and subdivisions against flooding and erosion by storing water and slowly releasing it. They require regular maintenance, which is typically the responsibility of a homeowners association.

SINGLE PROPERTY FLOOD **REDUCTION STRATEGIES**

Basement flooding is typically caused by improper site grading, sewer backup, and infiltration through basement walls. Possible solutions for homeowners include regrading the site, downspout disconnection, incorporating rain gardens, and reducing impervious pavement in the yard.

STREET TREES

Street trees are trees planted in the public right-of-way, typically the area between the street and sidewalk or house. Street trees capture and filter rainwater, reduce air pollution, and increase property values.











WATER AND SEDIMENT CONTROL BASINS (WASCOB)

WASCOBs are earthen basins constructed to trap sediment and water. The basins help prevent sediment from reaching streams and reduce gully erosion.

SEPTIC SYSTEM MAINTENANCE

Failing septic systems are expensive to replace or repair, and improper maintenance is the most common cause of system failure. When septic systems fail, untreated waste is released posing risk to a the community's health and contaminating water wells.

ACTIONS FOR FORESTS

TIMBER STAND IMPROVEMENT (TSI)

TSI involves periodic cutting in an immature stand of trees to stimulate growth. The best way to determine if a forest is suitable for TSI is to have a professional forester assess the stand. TSI helps native trees thrive that helps absorb stormwater more effectively.

INVASIVE SPECIES REMOVAL

Invasive species are plants or animals that are not native to our area and are likely to cause harm to the environment and the economy. Invasive species are one of the greatest threats to natural resources in Illinois. When invasive plants choke out the native plants, it can cause erosion problems due to their shallow roots. Removing invasive plants, and replacing them with native species, can significantly improve environmental health, stormwater retention, and reduce erosion.







LOGJAM REMOVAL

Logjams are a natural occurrence, and provide beneficial habitat for fish and wildlife. However, logjams can also have negative consequences; they can increase the impacts of flooding by causing water to back up and over the banks. Logjam removal should only be performed after a thorough inspection. **STREAM/LAKE DREDGING** Periodically, sediment will accumulate in ponds to the point that they become too shallow to effectively capture water. Although sediment must be tested prior to removal, it can usually be disposed of in a landfill or spread on land elsewhere and be reseeded. Occasionally a permit is needed for dredging.

SHORELINE/STREAMBANK STABILIZATION AND

CHANNEL RESTORATION There are several different ways to stabilize eroding streams and shorelines. Some methods include stonetoe protection, two-stage channels, and structures (typically made of rock) that slow the flow of water to prevent further erosion. PONDS AND WETLANDS

Wetlands are among the most effective ways to remove pollution from stormwater and can also help with flood control. Native plants on the edge of ponds and wetlands help protect against erosion, provide critical habitat, and reduce nuisance animals, such as Canada Geese.

RIPARIAN BUFFERS

Ripiarian buffers are the undisturbed, native vegetation areas next to a stream. They protect the stream, support wildlife, reduce erosion, provide recreational space, and filter water pollutants.

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Madison County Watershed Plans www.co.madison.il.us/departments/planning_and_development

